Section I (Amendments to the Claims)

Please amend claim 11 as set out in the following listing of the claims of the application.

1. **(Previously presented)** A gas sensor assembly for sensing halogen species comprising:
a substrate having a substrate surface; and

at least one gas sensor, wherein the gas sensor comprises:

a free-standing support structure, wherein the free standing support structure comprises at least two spaced apart contacts that project above the substrate surface into an air cavity and a lateral surface that spans between the projecting contacts with an air cavity therebeneath, wherein the free-standing support structure is fabricated of a support material that is resistant to the halogen species; and

a metal gas sensor element positioned on at least the lateral surface of the free-standing support structure, wherein said metal sensor element comprises a metal or metal alloy exhibiting a detectable change upon contact with a halogen species.

2. **(Original)** The gas sensor assembly of claim 1, wherein the metal sensor element comprises a transition metal or a noble metal.

3. **(Original)** The gas sensor assembly of claim 1, wherein the metal sensor element comprises Ni or Ni alloy.

4. **(Original)** The gas sensor assembly of claim 1, wherein the free-standing support structure comprises silicon carbide.

5. **(Original)** The gas sensor assembly of claim 1, wherein the free-standing support structure comprises an etch-resistant polymer.

6. **(Original)** The gas sensor assembly of claim 1, further comprising means for monitoring the change in the metal sensor element upon contact thereof with the halogen species, and means for responsively generating an output signal.

7. **(Original)** The gas sensor assembly of claim 1, wherein contacting of the halogen species with the metal sensor element effects a temperature-sensitive reaction of the halogen species and the metal sensor element, and wherein the assembly is constructed and arranged for passing current through the metal sensor element, for heating thereof to facilitate the temperature-sensitive reaction.

8. **(Original)** The gas sensor assembly of claim 1, comprising a multiplicity of said metal sensor elements, forming an array.

9. **(Original)** The gas sensor assembly of claim 8, wherein the array is constructed and arranged to monitor different halogen species, and/or to operate in different operating modes in different elements of the array.

10. **(Original)** The gas sensor assembly of claim 8, wherein the array is constructed and arranged to monitor the same halogen species at different process conditions.

11. **(Currently amended)** A gas sensor assembly comprising:

a substrate; and

a free-standing silicon carbide support structure comprising:

at least one protruding support rising above the substrate and a lateral structure contacting the protruding support, wherein the lateral surface is coated with a layer of nickel or nickel alloy, wherein said nickel or nickel alloy layer is adapted to exhibit a response indicative of the presence or change of concentration of a target gas species.

12. **(Previously presented)** A gas sensor assembly comprising:

a substrate; and

a free-standing gas sensing element positioned on the substrate and arranged for contact with a gaseous environment susceptible to the presence or change of concentration of one or more target gas species therein, wherein said free-standing gas sensing element comprises:

a suspended support structure comprising at least one protrusion rising above the substrate and a lateral surface contacting the protrusion and extending beyond the protrusion to form an air gap thereunder and wherein at least the lateral surface is coated with a layer of a gas sensing material, and wherein said gas sensing material in exposure to the target gas species exhibits a response indicative of the presence or change of concentration of the target gas species in said gaseous environment.

13. **(Original)** The gas sensor assembly of claim 12, further comprising multiple spaced-apart contacts for supporting the free-standing gas sensing element.

14. **(Original)** The gas sensor assembly of claim 13, wherein said spaced-apart contacts comprise a material resistant to the target gas species.

15. **(Original)** The gas sensor assembly of claim 14, wherein the target gas species comprises halogen-containing compounds, and wherein the spaced-apart contacts comprises silicon carbide.

16. **(Original)** The gas sensor assembly of claim 13, wherein the free-standing gas sensing element is supported only by said spaced-apart contacts.

17. **(Original)** The gas sensor assembly of claim 12, further comprising a barrier layer for protecting a substrate member thereunder.

18. **(Original)** The gas sensor assembly of claim 14, wherein said barrier layer comprises a material resistant to the target gas species.

19. **(Original)** The gas sensor assembly of claim 18, wherein the target gas species comprises halogen-containing compounds, and wherein the barrier layer comprises silicon carbide or an etch-resistant polymer.

20. **(Original)** The gas sensor assembly of claim 12, further comprising one or more spaced-apart contacts fabricated over a barrier layer, wherein said spaced-apart contacts supports the free-standing gas sensing element.

21. **(Original)** The gas sensor assembly of claim 20, wherein said spaced-apart contacts and said barrier layer form an integral contact/barrier element for supporting the free-standing gas sensing element and isolating same from an underlying substrate.

22. **(Original)** A method of monitoring a fluid locus for the presence of a target gas species therein, said method comprising:

exposing fluid at said fluid locus to a gas sensor assembly as in claim 12;

monitoring said gas sensor assembly; and

responsively generating an output signal when the gas sensor assembly exhibits a response indicative of the presence or change of concentration of the target gas species in said fluid locus.

23. **(Original)** The method of claim 22, wherein the fluid locus comprises an ambient gas environment of a manufacturing process.

24. **(Original)** The method of claim 22, wherein the fluid locus comprises a fluid stream in a semiconductor processing plant.

25. **(Original)** The method of claim 22, wherein the target gas species comprises a fluoro species selected from the group consisting of NF_3, SiF_4, C_2F_6, HF, F_2, COF_2, ClF_3, IF_3 and activated species thereof.

26. **(Previously presented)** A method of manufacturing a gas sensor assembly comprising a substrate and a free-standing gas sensing element positioned on the substrate and arranged for contact with a gaseous environment susceptible to the presence or change of concentration of one or more target species therein, the free-standing gas sensing element comprising a suspended support structure having at least one protrusion rising above the substrate and a lateral surface contacting the protrusion and extending beyond the protrusion to form an air gap thereunder and wherein at least the lateral surface is coated with a layer of a gas sensing material, and wherein said gas sensing material in exposure to the target gas species exhibits a response indicative of the presence or change of concentration of the target gas species in said gaseous environment, said method comprising the steps of:

depositing on a base structure a first molding material layer;

depositing a second molding material layer on said first molding material layer;

patterning said second molding material layer to form recesses therein that defines a predetermined supporting structure;

depositing a support material in said recesses;

selectively removing the second molding material layer, to form a support structure;

depositing on the support structure a gas sensing material; and

selectively removing the first molding material layer to release the support structure, thereby forming the free-standing gas sensing element comprising the suspended support structure with a layer of gas sensing material coated on at least the lateral surface thereof.

27. **(Previously presented)** The method of claim 26, wherein the first and second molding materials are the same.

28. **(Previously presented)** The method of claim 26, wherein the first and second molding materials are characterized by different removability.

29. **(Previously presented)** The method of claim 26, wherein the support material comprises silicon carbide, wherein the first molding materials comprise silicon dioxide, and wherein the second molding material comprises polysilicon.

30. **(Previously presented)** The method of claim 26, wherein the gas sensing material comprises a transition metal or a noble metal.

31. **(Previously presented)** The method of claim 26, wherein the support material comprises an etch-resistant polymer.

32. **(Previously presented)** The method of claim 26, wherein the gas sensing material comprises Ni or Ni alloy.

33. **(Previously presented)** The method of claim 26, wherein said base structure comprises one or more contacts for supporting the free-standing gas sensing element.

34. **(Previously presented)** The method of claim 33, wherein said one or more contacts are formed of silicon carbide.

35. **(Previously presented)** The method of claim 26, wherein said base structure comprises multiple spaced-apart contacts for supporting the free-standing gas sensing element.

36. **(Previously presented)** A method of manufacturing a gas sensor assembly comprising a substrate and a free-standing gas sensing element positioned on the substrate and arranged for contact with a gaseous environment susceptible to the presence or change of concentration of one or more target gas species therein, the free-standing gas-sensing element comprising a suspended support structure having at least one protrusion rising above the substrate and a lateral surface contacting the protrusion and extending beyond the protrusion to form an air gap thereunder and wherein at least the lateral surface is coated with a layer of a gas sensing material, and wherein said gas sending material in exposure to the target gas species exhibits a response indicative of the presence or change of concentration of the target gas species in said gaseous environment, wherein said free-standing gas sensing element is supported by one or more spaced-apart contacts fabricated over a barrier layer, said method comprising the steps of:

depositing on the substrate a first molding material layer;

patterning said first molding material layer to form at least one barrier recess that defines a predetermined barrier structure overlaying the substrate;

depositing in said barrier recess a barrier material;

depositing a second molding material layer over the first molding material layer and the barrier material;

patterning said second molding material layer to provide contact recesses that define one or more predetermined spaced-apart contacts overlaying the barrier material;

depositing in said contact recesses a contact-forming material;

depositing a third molding material layer over the second molding material layer and the contact-forming material;

patterning said third molding material layer to provide support recesses that define a predetermined support structure overlaying both the contact-forming material and the second molding material layer;

depositing in said support recesses a support material;

selectively removing the third molding material to form a protruding support structure;

depositing a gas sensing material on the protruding support structure; and

selectively removing the first and the second molding materials, thereby forming the free-standing gas sensing element comprising the suspended support structure coated on at least the lateral surface thereof with the layer of gas sensing material,

wherein such free-standing gas sensing element is supported by such spaced-apart contacts overlaying the barrier layer, and wherein the barrier layer overlays and protects the substrate.

37. **(Previously presented)** A method for forming a free-standing gas sensing element comprising a suspended support structure and a gas sensing layer formed thereon, comprising the steps of (1) forming said suspended support structure on a substrate in a pattern of at least two spaced apart protruding contacts with a lateral structure spanning between the protruding spaced apart contacts and by using multiple sacrificial molding layers that are subsequently removed to form an air cavity under the lateral structure; and (2) depositing said gas sensing layer over the suspended support structure.

38. **(Previously presented)** A method for forming a free-standing gas sensing element comprising: a substrate; a suspended silicon carbide support structure positioned on the substrate; and a gas sensing metal layer thereon, comprising the steps of (1) forming said suspended silicon carbide support structure by using multiple sacrificial molding layers that are subsequently removed to release said support structure, wherein the support structure comprises at least one protrusion rising above the substrate and a lateral surface supported by the protrusion forming an air gap between the substrate and the lateral surface, wherein said sacrificial molding layers comprises materials selected from the group consisting of silicon dioxide and polysilicon; and (2) depositing said gas sensing metal layer over the suspended silicon carbide support structure.

39. **(Canceled)**